

09455-07089 668020-5/54E60

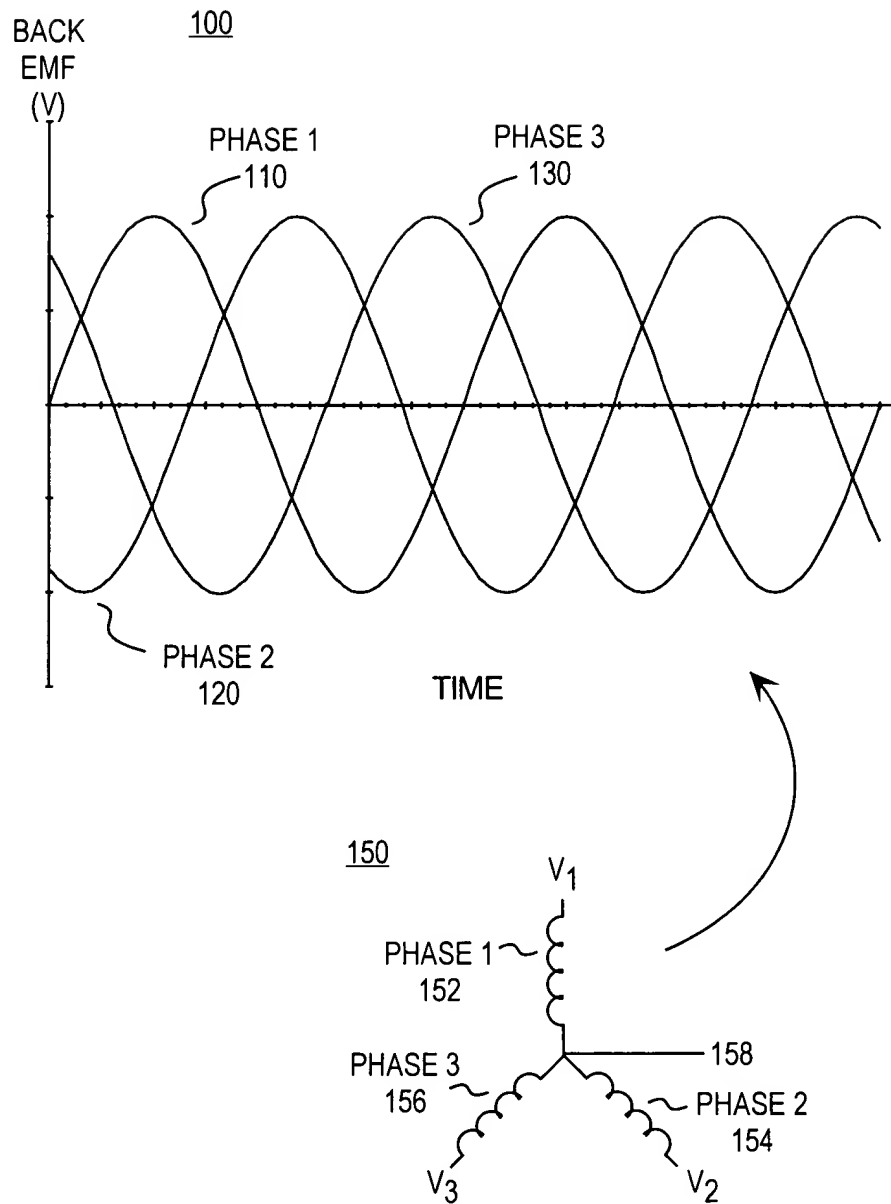


FIG. 1

6680/0" 5/25/1E60

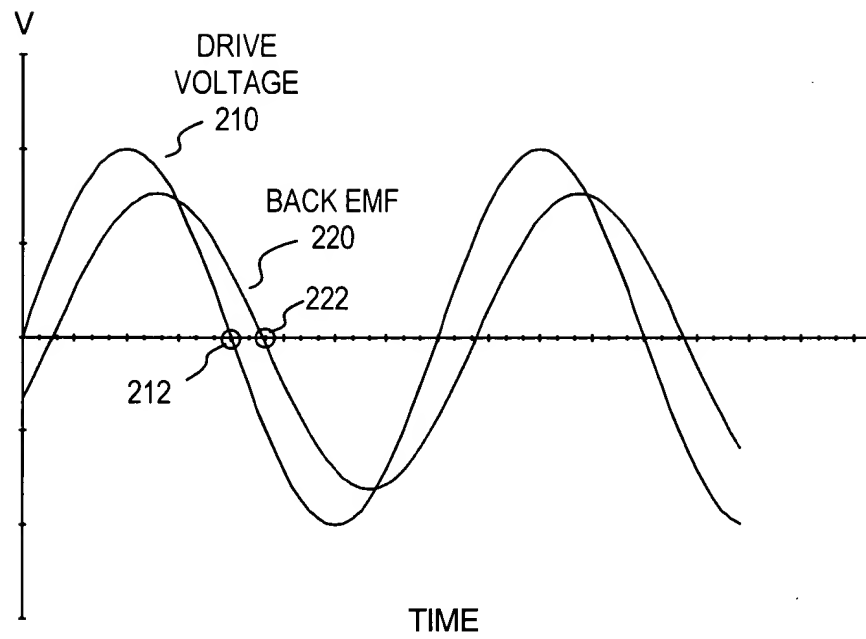


FIG. 2

09349575.070899

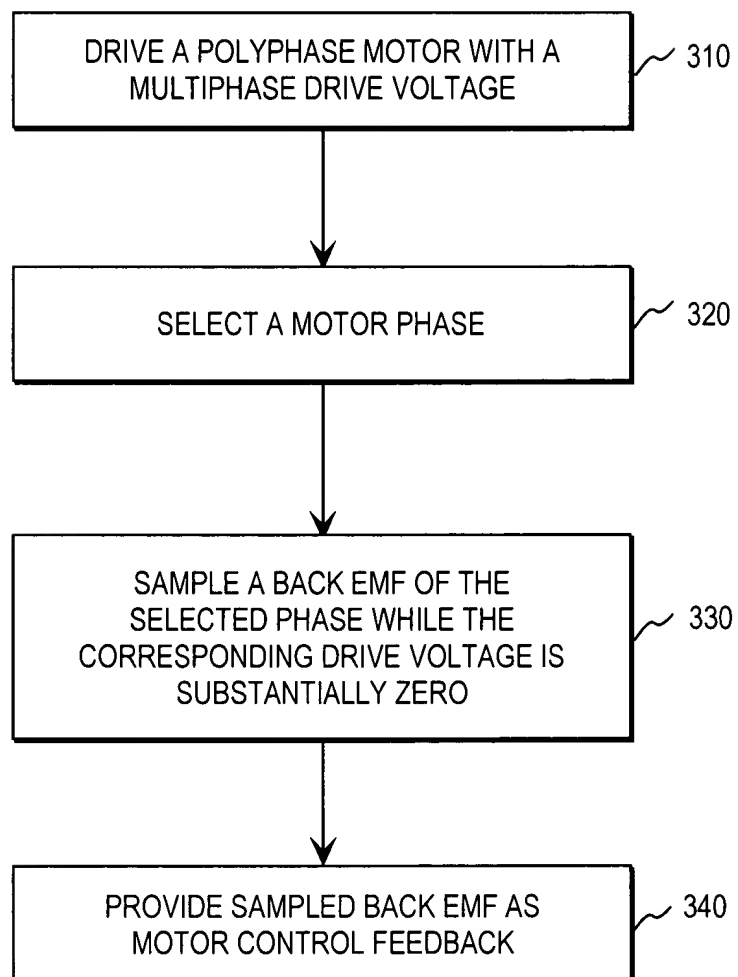


FIG. 3

6680/0"5/56HE60

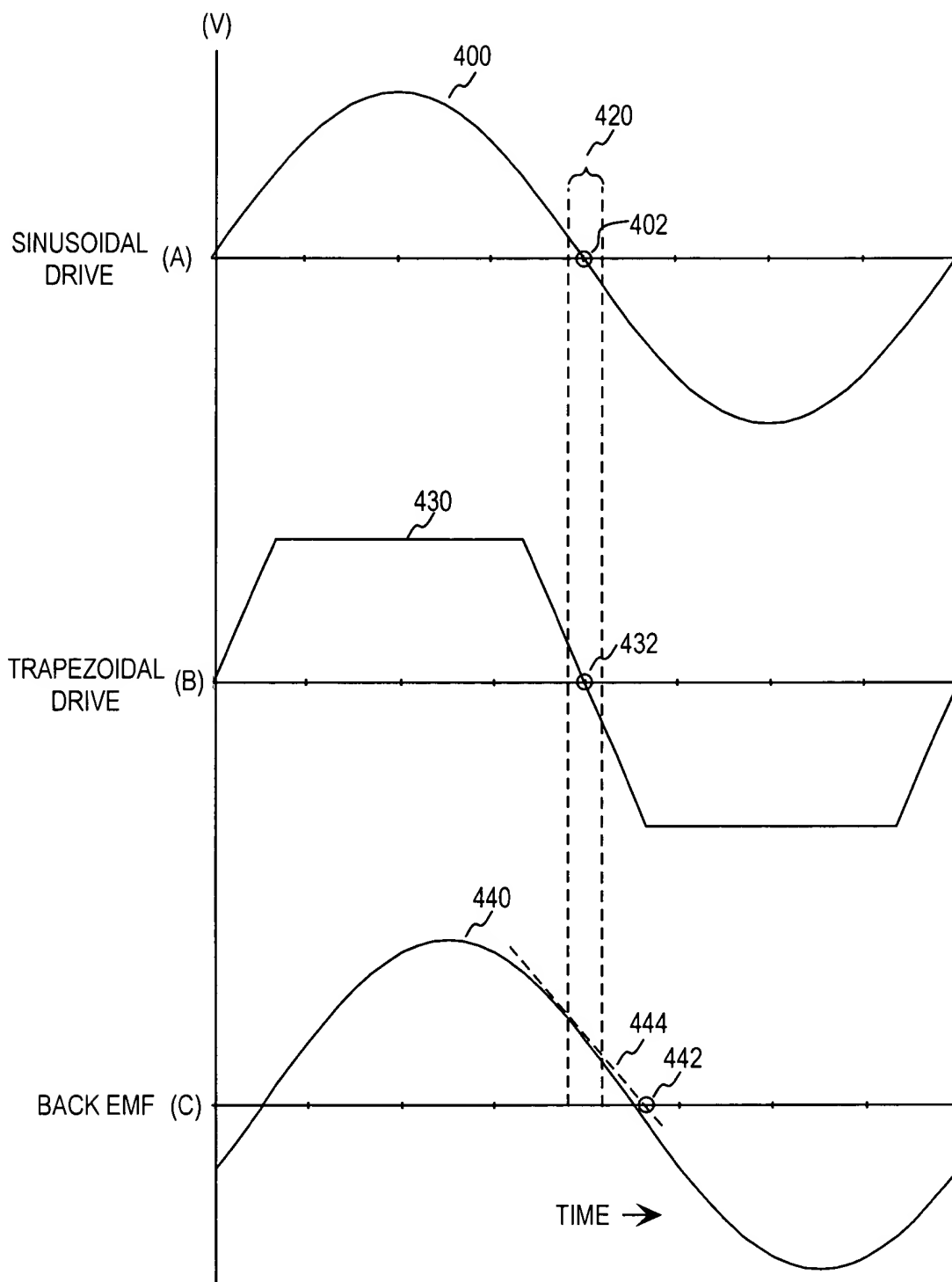


FIG. 4

668020 5254E60

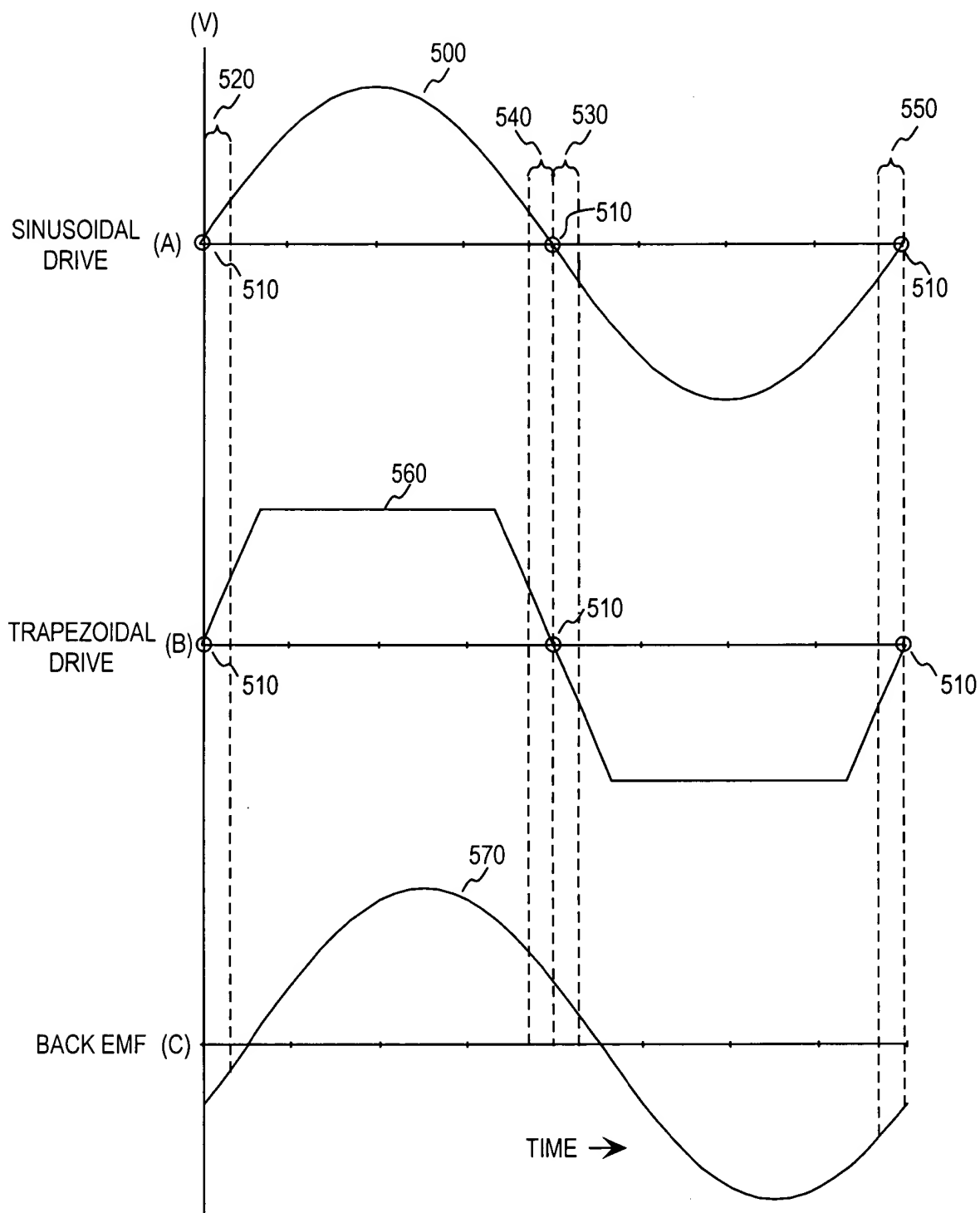


FIG. 5

The block diagram illustrates a control system for a brushless DC motor. The components and their interconnections are as follows:

- 610 PWM INVERTER**: Receives a control signal from the **640 WAVEFORM GENERATOR** and drives the **620 BRUSHLESS DC MOTOR**.
- 620 BRUSHLESS DC MOTOR**: The motor being controlled, which provides feedback to the **630 BEMF DETECTOR** and the **670 SPEED DETECTOR**.
- 630 BEMF DETECTOR**: Detects the back electromotive force (BEMF) from the motor and provides a signal to the **650 PID COMMUTATION CONTROL**.
- 670 SPEED DETECTOR**: Detects the motor speed and provides a signal to the **660 PID SPEED CONTROL**.
- 660 PID SPEED CONTROL**: Receives a reference speed  $\omega_c$  and the speed feedback from the **670 SPEED DETECTOR**. It outputs a control signal to the **640 WAVEFORM GENERATOR**.
- 640 WAVEFORM GENERATOR**: Generates the PWM signal for the **610 PWM INVERTER** based on the control signal from the **660 PID SPEED CONTROL** and the BEMF signal from the **630 BEMF DETECTOR**.
- 650 PID COMMUTATION CONTROL**: Receives the BEMF signal from the **630 BEMF DETECTOR** and a reference commutation frequency  $\omega_c$ . It outputs a signal to the **640 WAVEFORM GENERATOR**.

```
graph LR
    RefSpeed[ωc] --> 660
    RefComm[ωc] --> 650
    660 --> 610
    660 --> 640
    650 --> 640
    640 --> 610
    610 --> 620
    620 --> 630
    620 --> 670
    630 --> 650
    670 --> 660
```

FIG. 6

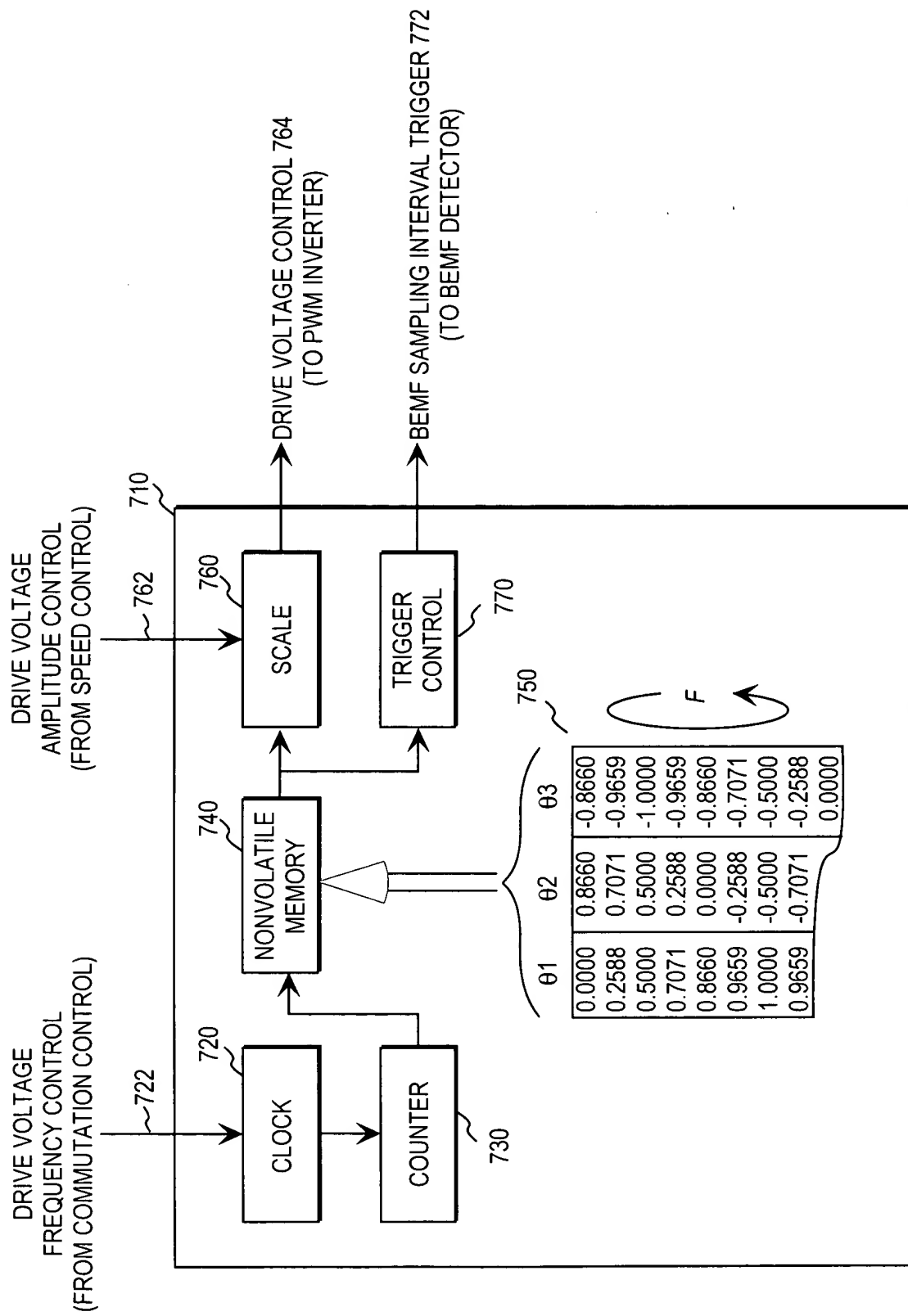


FIG. 7

09349575.070899

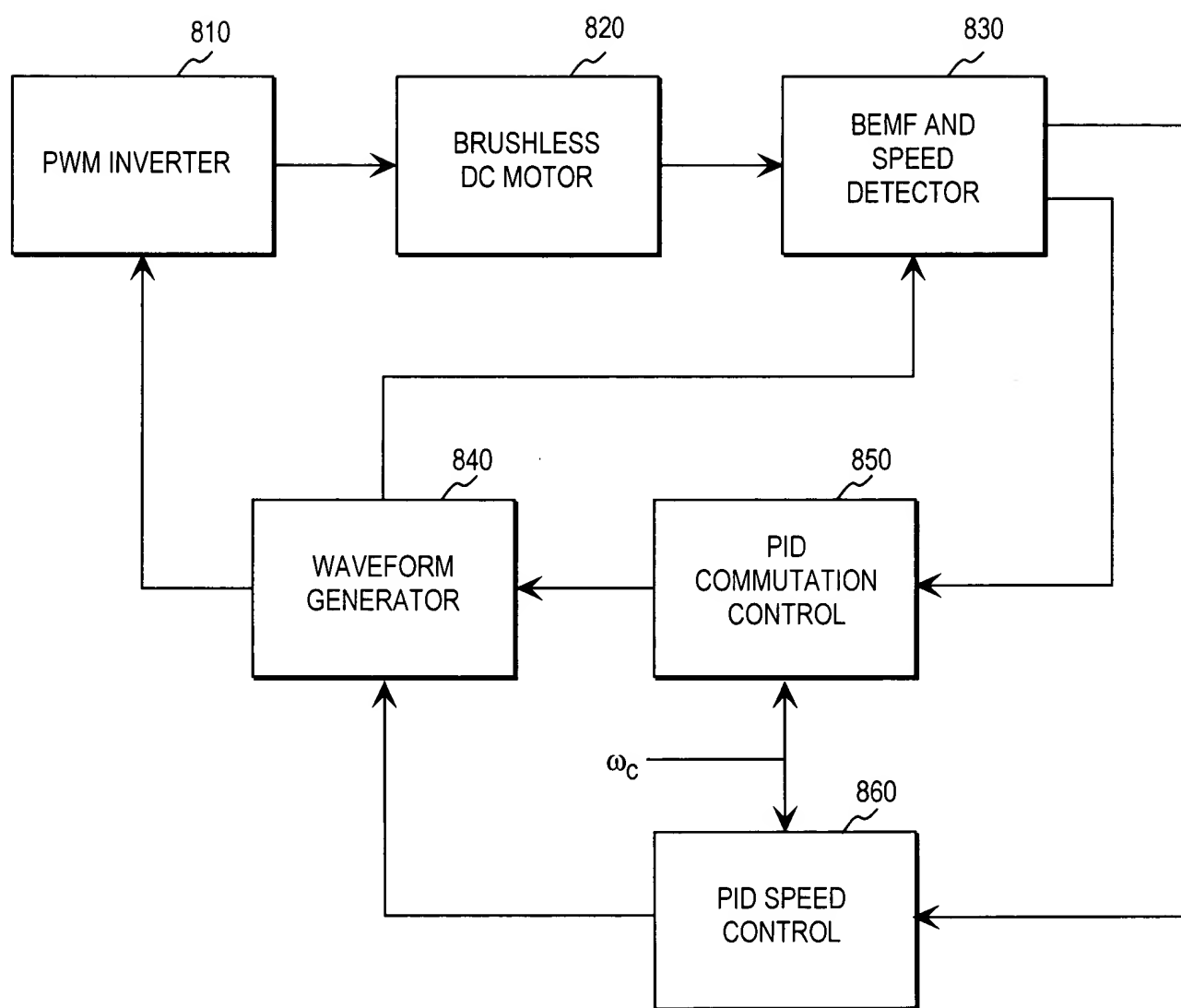


FIG. 8



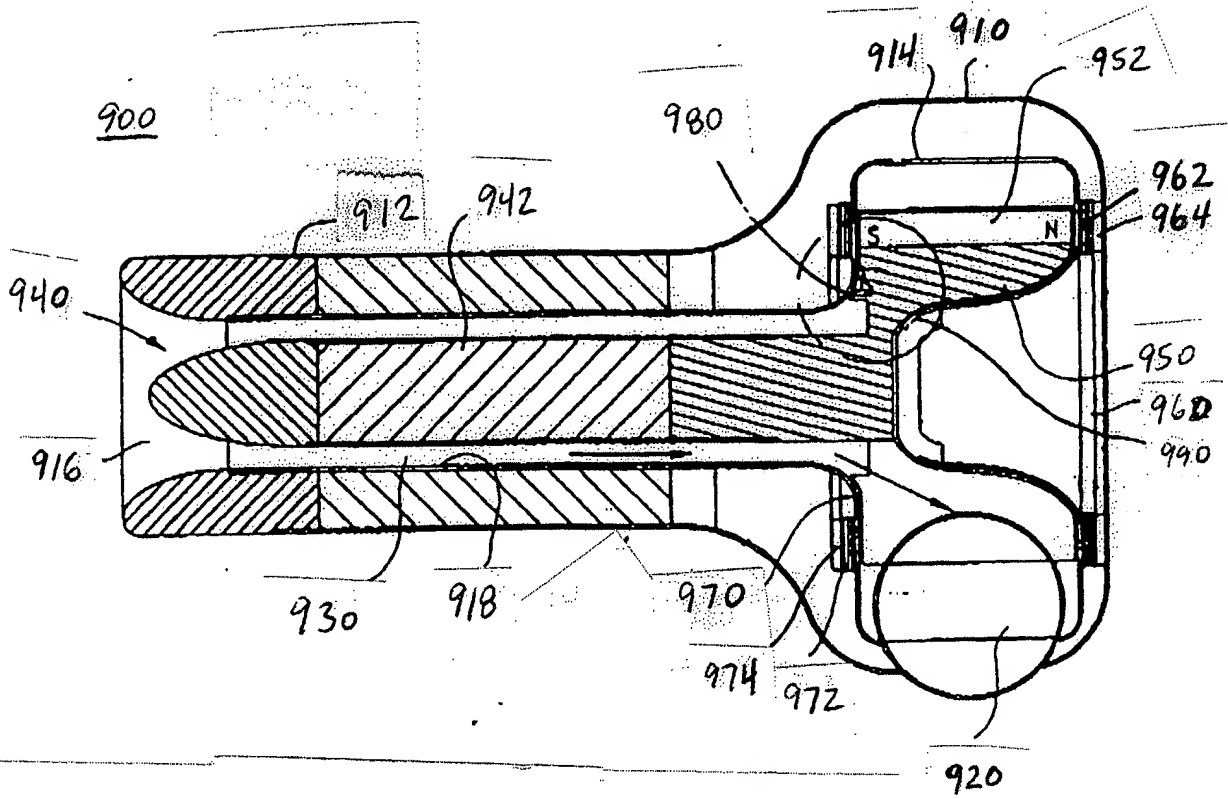


FIG. 9

668040" 52564E60